Can Scenario-Planning Help?

ALC3194: Scenario Planning Toward Climate Change Adaptation
Module 3

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Module Outline

1. Factors influencing SP use
2. Breaking down uncertainty, complexity and controllability
3. Conceptual models and other tools
4. Where does uncertainty crop up in decision making

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Module Objectives

By the end of the session, you should be able to:

- Determine if and how scenario planning might contribute to a decision or planning situation
- Use 1 or more tools to depict a problem context and identify sources of uncertainty
- Consider different levels of uncertainty
- Distinguish internal (controllable) and external (uncontrollable) uncertainty
- Identify some ways that climate change adds uncertainty

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Activity-A future scenario…Take 1

…for where you live

Issue: Quality of Life

Problem: Will I still want to live where I am living in 20 years?

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Characteristics influencing SP use

Uncertainty

Complexity

Controllability

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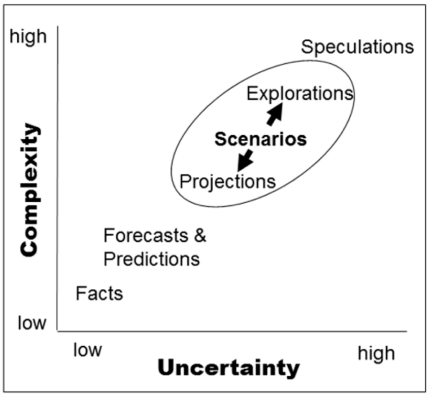
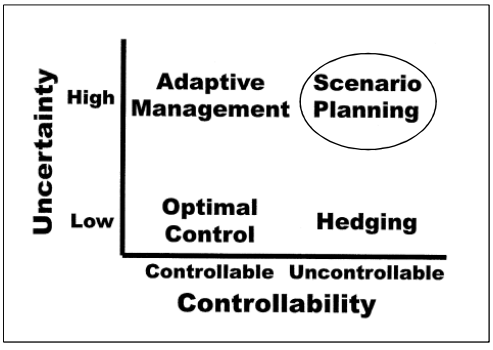
Characteristics influencing SP use

Uncertainty, complexity and controllability



Adapted from Zurek and Henrichs, 2007



Modified from Peterson et al. 2003

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Other characteristics influencing SP use

Decision or planning time frame & cycles
- Long-term, strategic planning
- Decision needed, no time to reduce uncertainty

Level of stakeholder engagement
- Numerous or diverse groups have stake in the decision or planning outcomes

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Characteristics influencing SP use

Complexity
- System drivers, variables & scientific understanding
- Stakeholders

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Controllability
- Human control over internal variables vs. influence of external drivers

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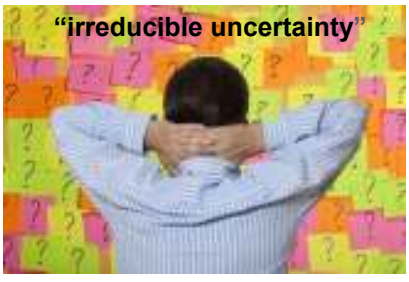

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Complexity-part 1

1. Number of system drivers, variables and current scientific understanding
   - What is the extent of science and technical knowledge of system? What forces are driving it?
   - How confidently can we model it (model uncertainty linked to parameters and structure)?

"Many current conservation problems are too complex and involve too many different interest groups to be solved through narrowly focused, predictive studies."—Peterson et al. 2003

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Complexity-part 2

2. Focal scale or bounds of system linked to issue or problem
   - Is it narrowly focused or broad and comprehensive (scope of issue)?

3. Number & diversity of stakeholders
   - Who influences the system?
   - In what way?
   - At what scale?

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Controllability-part 1

Factors that influence the system include…

1. Internal system variables and their relationships
   - Some of these are control variables and represent management levers (i.e., the strategies or actions that managers make decisions about)
2. External forces that influence the focal system but over which managers have little or no control
   - What impact might these have?

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Controllability-part 2

Drivers/Driving forces

• External forces with the potential to alter system character or its dynamics
• Not affected by what goes on within the system
• May have a direct or indirect influence on resource(s) of concern
• Often the one or more sources of uncertainties around which scenarios are developed

"When future possibilities are influenced by large but highly uncertain driving forces, a scenario planning approach is appropriate."—Dermawan et al. 2012

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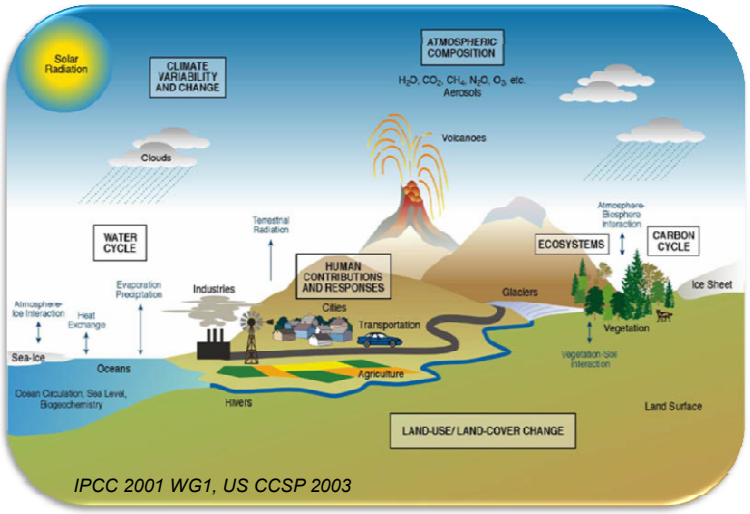
Driving forces-Categories (STEEP)

	Category	Drivers
E	Environmental	Climate change Air and water pollution Invasive non-native species Environmental policy
E	Economic	Economic growth Commodity prices Demand and consumption patterns Income and distribution Market development
P	Political	Macroeconomic policy Land-use plans, zoning, management Governance and corruption Property rights and land tenure
S	Social & Demographic	Population growth/decline Migration Cultural values Education Religious values
T	Technological	Technological innovation Technology choice

Examples of Climate Change-Related Drivers

Frequency & magnitude of drought, flood
Changes in seasonal patterns of rain & snow
Sea level rise
Storm surge, erosion and washover
Frequency of extreme events

Drivers & Uncertainty-Climate



IPCC 2001 WG1, US CCSP 2003

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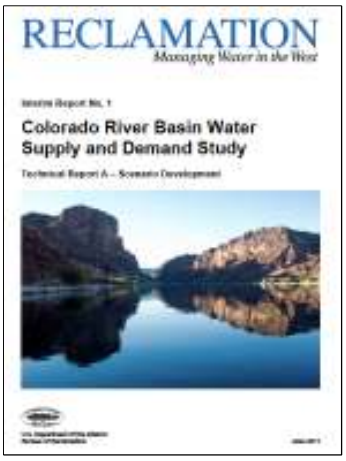
Drivers & Uncertainty-Social

Social & Demographic



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Drivers & Uncertainty-Health

Human & Wildlife

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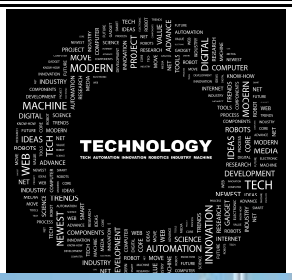
Drivers & Uncertainty-Technology



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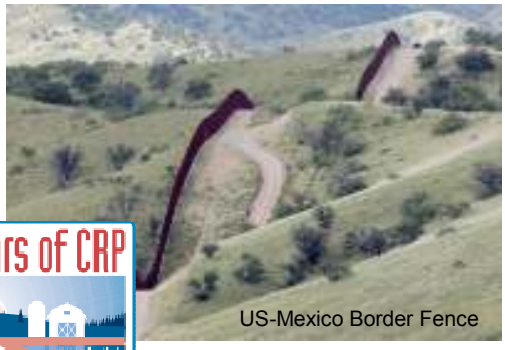
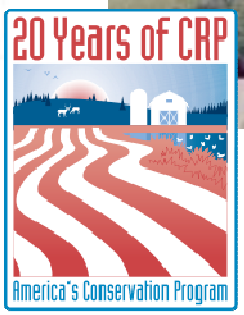
Drivers & Uncertainty-Politics and Policy





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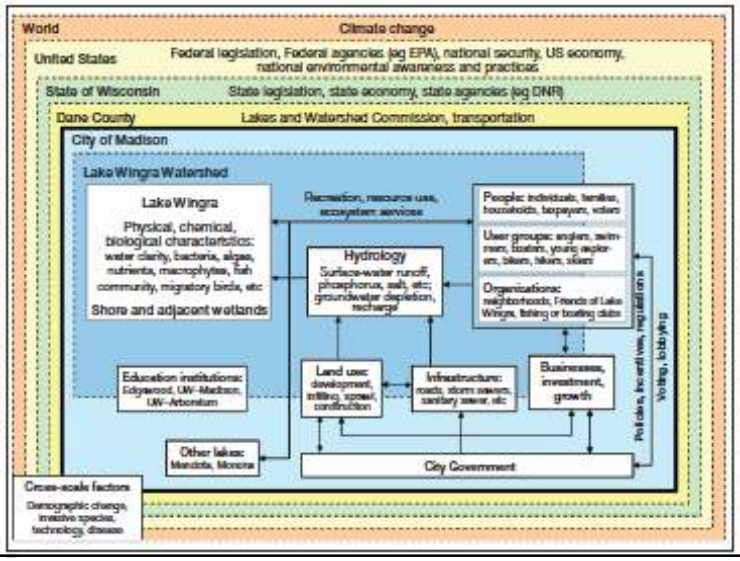
Drivers-Scale: Lake Wingra Example

World United States



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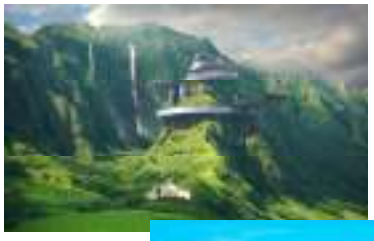
Activity….Drivers: STEEP & Scale

A future scenario for where you live…Take 2

STEEP

Social & Demogra



SCALE

World United Sta

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Summary: When to use SP

1. The focal system is complex
   - High number of variables
   - Broad scope
   - Multiple and diverse stakeholders
2. There are 1 or more external drivers that could strongly influence resource in uncertain ways (low controllability)
3. Time frame is decades out OR sooner than uncertainties can be resolved/reduced
4. *Willingness to move away from one future planning & think outside the box*

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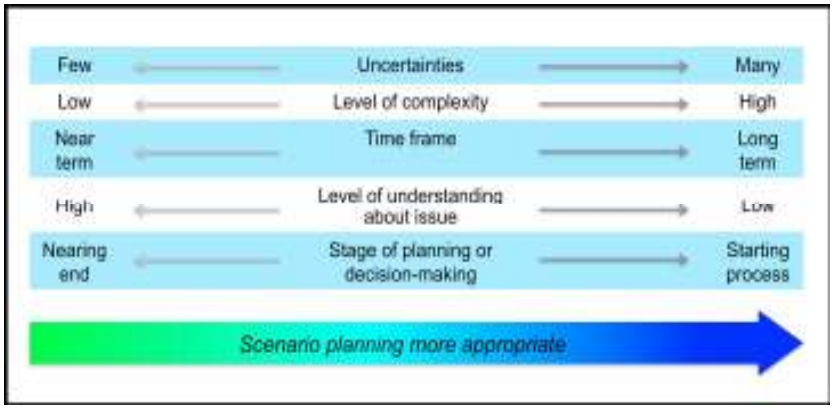
Summary Figure: When to use SP



Modified from Wiseman et al. 2011

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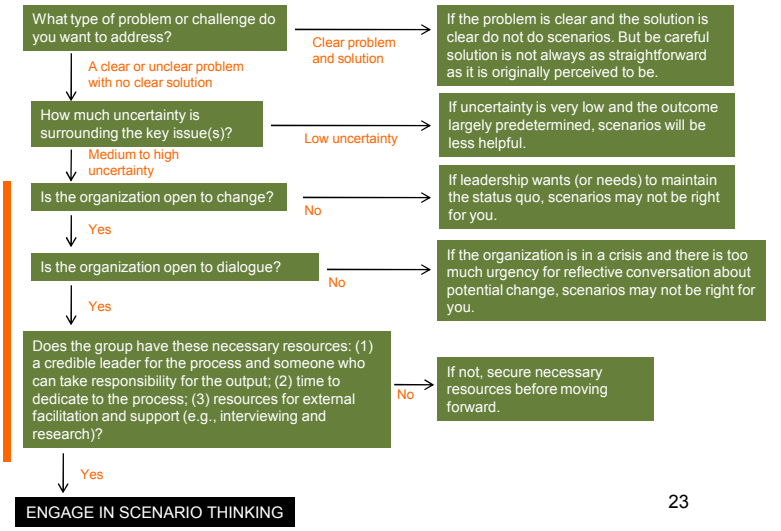
GBN Decision tree…is scenario planning appropriate for addressing your challenge or problem?



From Scearce, Fulton and GBN 2004 What if? The art of scenario thinking for non-profits. 119 pp.

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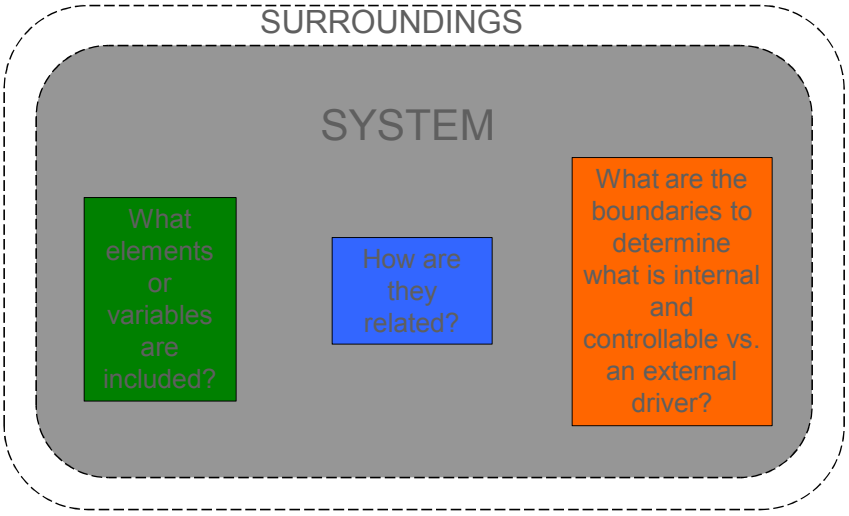
Thinking about systems: How do we identify uncertainty, complexity & controllability?



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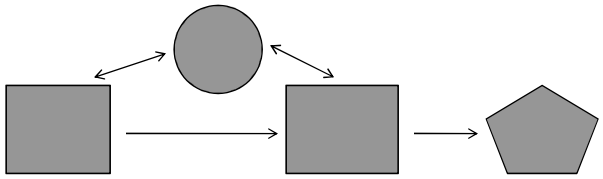
Conceptual model-1

What are they?

- Graphical depiction of interactions or relationships between different parts of a system, decision components (actions), and (sometimes) outcomes
- Commonly used tool in planning and evaluation (e.g., Margoluis et al. 2009)



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Conceptual models-2

Why use one?

- Bring out and share participants mental models
- Ensure thinking about system in similar way
- Reveal underlying assumptions
- Helps define system boundaries (internal vs. external components)
- Helps identify uncertainties

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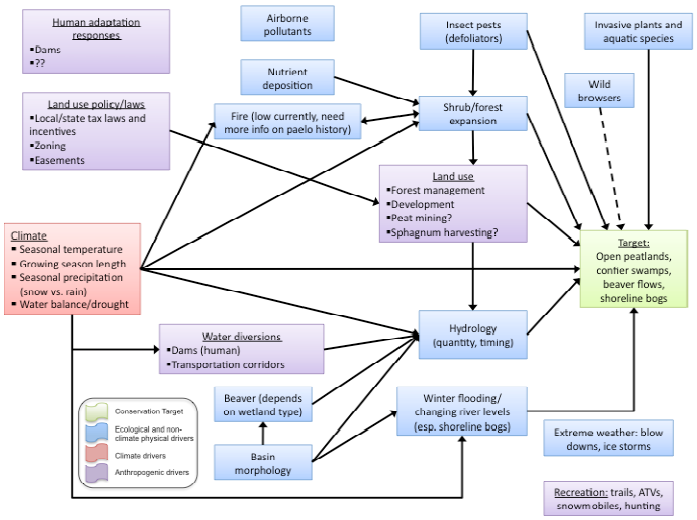
Conceptual models: Example

Boreal Peatlands NY



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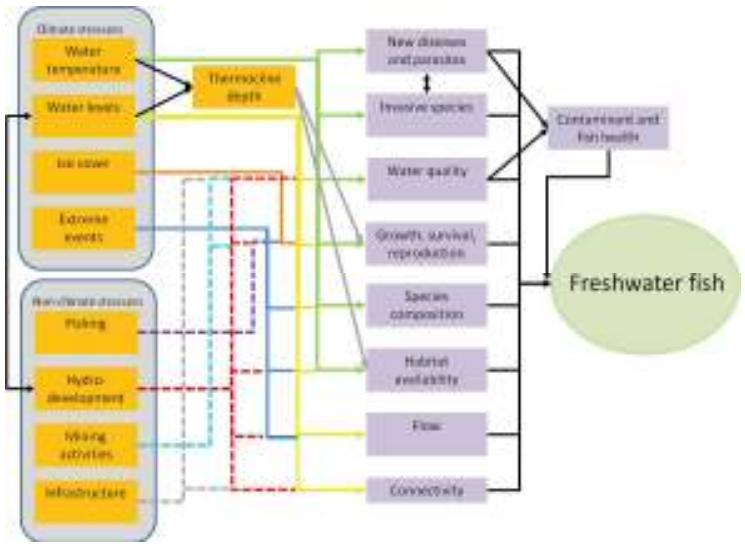
Conceptual models: Examples

Northern Ontario Fisheries



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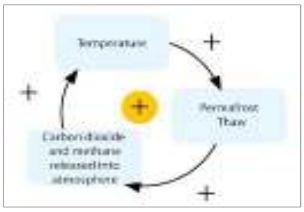
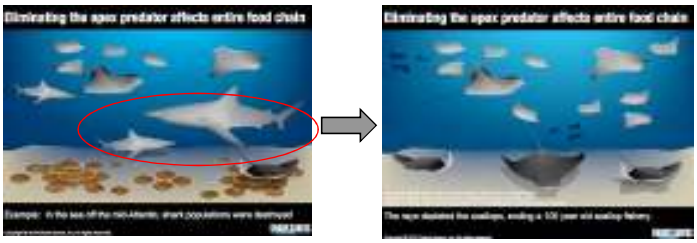
Other uncertainties (non-linear responses)…and conceptual models

1. Positive feedbacks



2. Thresholds

3. Cascading effects



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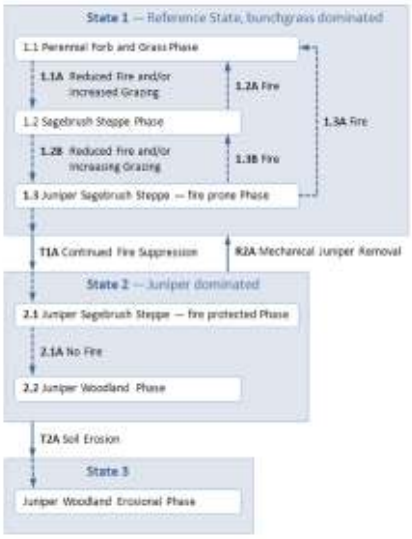
Conceptual models: Example

State & Transition Models



State 1
Bunchgrass
Dominated

State 2
Juniper
Dominated

State 3
Increasing
Erosion

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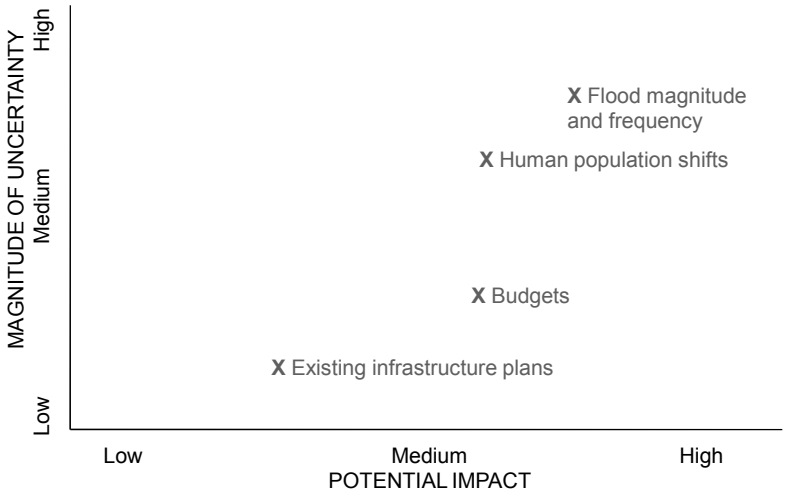
Organize Uncertainties



K. Van Der Heijden. Scenario building: The Art of Strategic Conversation. John Wiley, Chichester, England, 1996.

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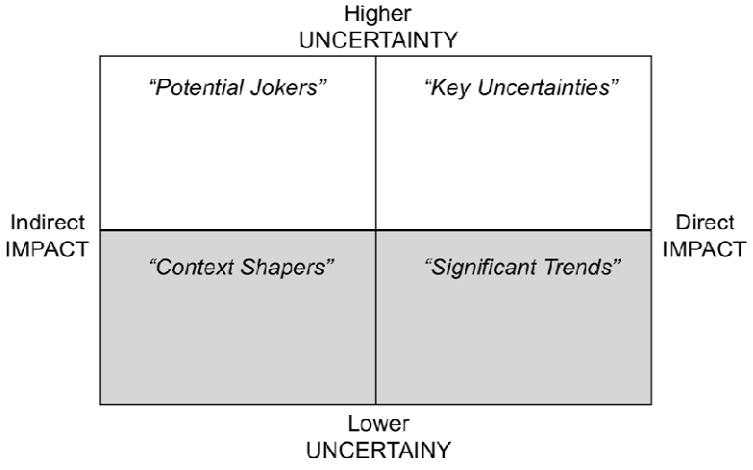
Organize Uncertainties



modified from Ratcliffe 2002

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Activity…try out a tool

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Some points at which uncertainty affects planning and decisions

Problem & Objectives-How clear or certain are they?

Resources-How well do we understand the impacts from climate change or other influences?

Alternative Strategies/Actions-How certain are the effects (consequences) of the alternative options you may consider? Could different conditions in the future strongly influence the consequences?

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Wrap up…

Are you hoping to:
✓ *Foster creativity?*

✓*Enable participants to view the system differently and uncover new insights?*

✓*Provide new perspectives on outcomes of future actions?*

✓*Push the range of uncertainty considered and challenge management?*

✓*Develop triggers that align with particular scenarios and enable quick recognition of a specific trajectory and recommended action?*

Module 3-Take Home

- There are uncertainties of different magnitude arising from diverse sources
- SP useful when uncertainties relevant to the issue are uncontrollable and/or irreducible
- SP useful if system complexity is high-lots of stakeholders and/or lots of system variables need considering
- SP was initially aimed at top-down/strategic decisions that orient management but can also be used for field-based decisions

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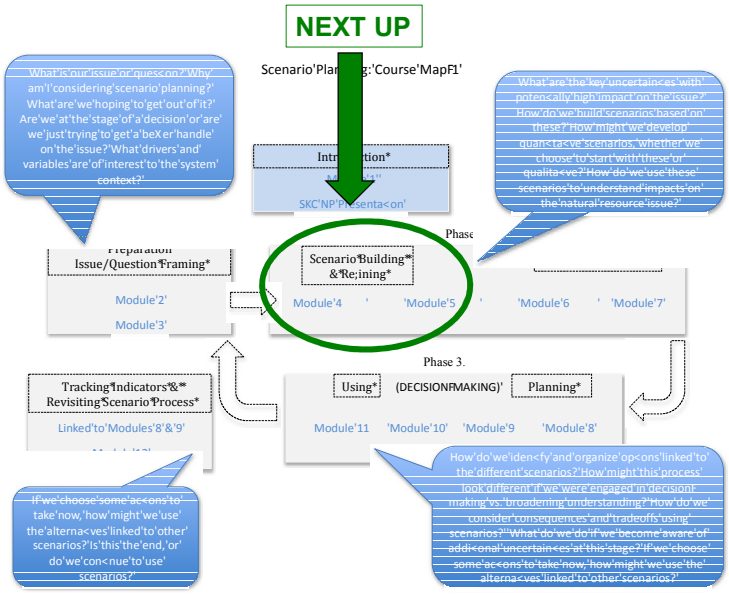
NEXT UP
Scenario Planning: Course Map P1
What is our issue or question? Why am I considering scenario planning? What are we hoping to get out of it? Are we at the stage of a decision or are we just trying to get a better handle on the issue? What drivers and variables are of interest to the system context?
What are the key uncertainties with potentially high impact on the issue? How do we build scenarios based on these? How might we develop qualitative scenarios, whether we choose to start with these or qualitative? How do we use these scenarios to understand impacts on the natural resource issue?
Introduction*
Phase
Issue/Question Framing*
Scenario Building* & Refining*
Module 2
Module 3
Module 4
Module 5
Module 6
Module 7
Phase 3.
Tracking Indicators & Revisiting Scenario Process*
Using* (DECISION MAKING)
Planning*
Linked to Modules 8 & 9
Module 11
Module 10
Module 9
Module 8
If we choose some actions to take now, how might we use the alternatives linked to other scenarios? Is this the end, or do we continue to use scenarios?
How do we identify and organize options linked to the different scenarios? How might this process look different if we were engaged in decision-making vs. broadening understanding? How do we consider consequences and tradeoffs using scenarios? What do we do if we become aware of additional uncertainties at this stage? If we choose some actions to take now, how might we use the alternatives linked to other scenarios?

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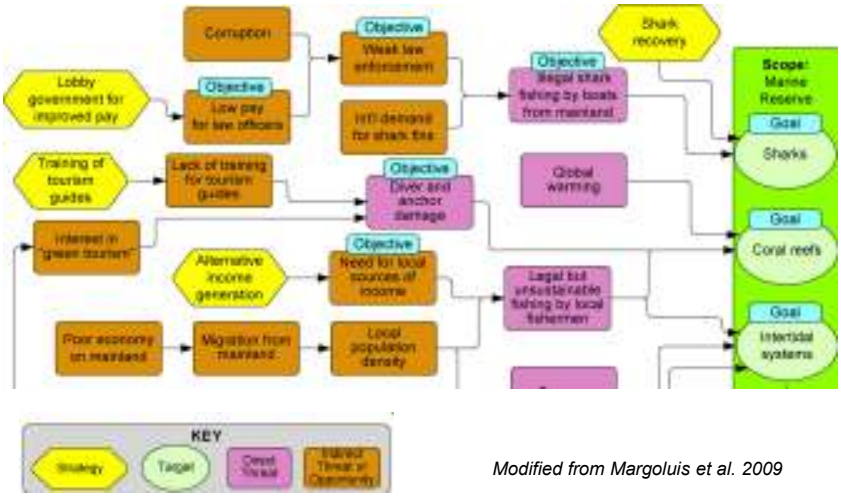
Conceptual models: Example

Decision Components
Marine System



Modified from Margoluis et al. 2009

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